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Response of River Flow to Precipitation and Snowmelt for two California Rivers: Russian River and the North Fork of the American River

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We have developed a coupled atmosphere-river flow simulation (CARS) system as part of a regional study of water resources. Our initial efforts have included simulations of the hydrologic response of the Russian River and the North Fork of the American river due to snowmelt during part of the 1995 winter.

The mesoscale atmospheric simulation provides surface level state variables, including precipitation partitioned into solid and liquid state. The land surface component of CARS computes the energy budget, including the surface snow budget (snow depth, melting rates) for each six hour time step. The atmospheric model grid results compare well with observed point values. Our land surface and river channel hydrology is based on the TOPMODEL code developed by Beven and Kirkby (1976). We have modified this code such that it is unidirectionally coupled to the atmospheric model and provides forty eight hour hydrograph forecasts. Our simulated hydrograph is very accurate (within 10%) for high flow stage, but performs modestly well (about 50% accurate) for low flow stages.

We present the results of our CARS system for these two California rivers during periods where snowmelt is occurring.

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1. 1994 Fall Meeting

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4. H

5. (a) H10 California's
1994/1995 Precipitation
(b). 1821 Floods, 1833
Hydroclimatology, 1854
Precipitation, 1860 Runoff
& streamflow
(c). N/A

6. N/A Oral

7. 50%

8. P.O. #

9. C

10. N/A

11. No